INTRODUCTION

Each year, more than 100 million women make decisions about beginning contraception after child birth. Proper family planning programs and adequate methods of contraception are important tools to avoid many problems in our world ***(Shaamash et al., 2005)***.

Intrauterine Contraception (IUC) is the most widely used method of reversible fertility regulation in the world. Over 100 million women worldwide use it for contraception ***(Population Report, 2007)***.

Cesarean delivery is defined as the birth of a fetus through incisions in the abdomianl wall (laparotomy) and the uterine wall (hysterotomy). This definition does not include removal of the fetus from the abdominal cavity in the case of rupture of the uterus or in the case of an abdominal pregnancy ***(Cunningham et al., 2010)***. Immediate post-placental placement of intrauterine contraceptive devices (IUCDs) provides women effective, long-term and reversible contraception that is convenient at a time in their lives when they face considerable demands on their time, unusually high levels of stress and significant disruptions in their usual routines. Previous trials of IUCD placement at the time of cesarean section have demonstrated high levels of device retention and low levels of complications ***(Cunningham et al., 2010)***.

Optimally, contraceptive plans should be reviewed as apart of prenatal care, revisited before the women leaves the hospital and implemented by three weeks postpartum. many, if not most, women resume sexual relations by six weeks postpartum, which is the most common time for a postpartum office visit ***(Speroff and Mishell, 2008).***

Intrauterine contraceptive device (IUCD) is a form of long acting reversible contraception which is regarded as one of the most effective reversible birth control method. It is estimated that approximately 128 million women are using the IUCD all over the world ***(Mbamara and Omojuwa, 2013).***

IUCD is the second most common modern method of contraception used by women in regions with large populations ***(Khawaja et al., 2007).*** It is a very attractive contraceptive method because it is effective, safe and reversible, does not require daily or monthly action and is cost effective ***(Aradhya, 2010).***

Device failure, painful abdominal cramps, expulsion, complete or partial uterine perforation, menstrual disturbances, increased risk of ectopic pregnancy, septic and spontaneous abortion in case of pregnancy with IUCD**.** Duplication insertion of IUCD has also been reported ***(Jindal et al., 2009).***

The IUCD strings are used to monitor and remove the device. The presence of the string in the vagina usually means

that the IUCD is in situ. A missing string is regarded as the first signs of perforation in approximately 80% of the cases ***(Ozgun et al., 2007).*** The reported incidence of perforated IUCD is 0.87 per 1000 insertions, and occurs mostly during insertion ***(Mbamra and Omojuwa, 2013).***

Fears about side effects, concerns about infection and infertility, lack of technical training for provides, and the time and costs involved in providing services combine to discourage use of IUCDs in many countries ***(Azmat et al., 2012).***

World Health organization (who) medical eligibility criteria state that risks generally outweigh benefits if postpartum insertion occurs between 48 hours and 4 weeks. However, immediate post-placental IUCD insertion (within 10 min) through the hysterotomy provides a good opportunity to achieve long-term contraception with minimal discomfort to the patient. No studies have reported any increase in the risk of infection or other complications related to this method of IUCD insertion ***(Kapp and Curtis, 2009).***

AIM OF THE WORK

The aim of current study is to compare the rates of IUCD expulsion and complications in immediate post-placental insertion during cesarean delivery versus delayed IUCD insertion (6-weeks after cesarean delivery).

Research question

Does the immediate post-placental insertion of IUCD during cesarean delivery more effective than delayed insertion (6 weeks after cesarean delivery)?

Study hypothesis

Null hypothesis: in the insertion of the IUCD, immediate post-placental insertion during cesarean not effective than delayed insertion (6 weeks after cesarean delivery).

Alternative hypothesis: in the insertion of IUCD, immediate post-placental insertion during cesarean delivery may be effective than delayed insertion (6 weeks after cesarean delivery).

CONTRACEPTION

Family planning has been cited as essential to the achievement of Millennium Development Goals (MDG) and is an important indicator for tracking progress on improving maternal health. It has a direct impact on women's health and well-being as well as on the consequence of each pregnancy ***(Najafi-Sharjabad et al., 2013).***

Almost all women are at risk for unintended pregnancy throughout their reproductive years. However, adolescents, formerly married women, and women of low socioeconomic status are at greater risk for contraceptive nonuse and for contraceptive failure; thus they are also at greater risk for unintended conceptions ***(AJOG, 1994).***

It is pertinent to identity the factors responsible for poor acceptance of family planning program in different socio-cultural and socio-economic groups ***(Sharma et al., 1997).***

Unintended pregnancies become a global epidemics most of them lead to unplanned birth or abortion ***(Singh et al., 2010)*** their live births, infants are more likely to be delivered preterm and with a low birth weight ***(Dietz et al., 1999)*** also it causes multiple consequences to society and mothers who are more likely to report postpartum depression ***(Rehan, 2011).***

Almost 43% of the unintended pregnancies were terminated. These alarmingly high statistics occurred even

though most women reported using some form of contraception ***(Kost et al., 2008).***

In menstruating women, experts suggest that women ^ age 50 years continue to use contraception for one year after their last menstrual period (i.e., menopause) and women <age 50 years continue to use contraception for two years after their last menstrual period ***(Delvin, 2015).***

Among couples attempting to avoid pregnancy, the who continue to use a method for one percentage year is approximately:

- Etonogestrel implant - 84 %
- Levonorgestrel-releasing IUCD - 80 %
- Copper containing IUCD - 78 %
- Ring or patch or pill - 67 %
- Diaphragm - 57 %
- Depot Provera - 56 %
- Fertility awareness based methods - 47 %
- Male condom - 43%
- Female condom - 41 %

(Trussell et al., 2015)

Choosing a hormonal contraceptive method is more complicated for women with certain medical disorders or personal characteristics, since physiologic changes and side effects associated with the method or with pregnancy may increase the risk of morbidity/mortality in these women. The WHO has published comprehensive tables of medical conditions and personal characteristics that may affect contraceptive choice ***(WHO, 2009).*** In 2010, the Centers for Disease Control and Prevention (CDC) modified the WHO tables for medical eligibility criteria for contraceptive use ***(CDC, 2011).***

Success of contraceptive practice lies in the acceptance of a regular contraceptive to prevent future pregnancies ***(Takkar et al., 2005).*** Also Cost and drug coverage issues impact use of and adherence to contraception ***(Trussell and Wynn, 2008).***

Contraceptive failure is common among users of short-acting reversible contraception such as oral contraceptives, contraceptive patches, contraceptive rings, barrier methods, and spermicides. In a review of contraceptive failure, oral contraceptives, contraceptive patches, and the vaginal contraceptive ring were associated with a 9% failure rate within the first year of typical use ***(Jones et al., 2012).***

Furthermore, because of the dependence on user compliance, nearly all initiatives aimed at improving uptake

and adherence with short-acting reversible contraception methods have had limited success in consistently reducing unintended pregnancy ***(Hauck and Costescu, 2015).***

Because long-acting reversible contraceptives (LARC) methods such as lUCDs and progestin-releasing implants are intrinsically highly effective and do not, depend on user compliance, more widespread use of LARC would reduce unintended pregnancy rates ***(Hauck and Costescu, 2015).*** They are recommended as first-line contraceptives for most women and adolescents ***(ACOG, 2014).***

The LARC Evidence from several other studies indicates that increasing use of LARC methods can reduce rapid repeat pregnancy among adolescents and repeat abortion among women who have had an induced abortion ***(ACOG, 2009; RCOG/FSRH, 2014).***

Both the American College of Obstetricians and Gynecologists and the Royal College of Obstetricians and Gynaecologists advocate the use of LARC methods for most women ***(ACOG, 2009; RCOG, 2012).***

According to a data brief from the Centers for Disease Control and Prevention's (CDC), there was a nearly 5-fold increase in the use of LARCs among US women aged 15 to 44 years from 1.5% in 2002 to 7.2% in 2011-2013 ***(CDC, 2014).***

In one study, the use of LARC depot medroxyprogesterone acetate (DMPA) or IUCD reduced the rate of repeat pregnancy termination within two years compared with women using shorter-acting methods (primarily oral contraceptive pills): 6.5% versus 14.5% ***(Rose and Lawlon, 2012).*** In a retrospective cohort study that compared women who needed an additional visit to initiate the IUCD or DMPA injection with those who had access to the IUCD, DMPA, and contraceptive implant at the time of their abortion, women with same-day access had significantly fewer abortions and births within 12 months and were more likely to use LARC ***(Langston et al., 2014).***

In one study that compared the BMD of patients using Implanon with those using lUCDs, no decrease was noted in the BMD of either group over a 2-year period ***(Birgisson et al., 2015).***

During 1970s, the scientists began investigating various other targets besides sperm that can be used for contraceptive vaccine development. They can be broadly divided into three categories: vaccines targeting gamete production [gonadotropin-releasing hormone (GnRH), follicle- stimulating hormone (FSH), and luteinizing hormone (LH)], gamete function [sperm antigens and oocyte zona pellucida (ZP)], and gamete outcome [human chorionic gonadotropin (hCG)] Contraceptive vaccines are under investigation ***(Ragesh, 2011).***

In 2007, the 10th summit group published their updated recommendations for regulatory approval for hormonal male contraception. This international group was designed to review the status of clinical development projects for male hormonal contraception ***(Nieschlag, 2007).***

Monthly injection of TU (testosterone undecanoate) is a safe, very effective and reversible contraceptive method in a high proportion of healthy fertile men ***(Gu et al., 2009).*** Also combination of dienogest and TU monthly injection showed 100% contraceptive efficacy and complete arrest of spermatogenesis. These data were based on findings of lack of sperm in the rat epididymis and suppression of spermatogenesis in testis tissue. No negative effects of lipid profiles were seen ***(Mistro et al., 2009).*** However, there is minimal data available on sperm suppression in humans and further investigation is needed.

INTRAUTERINE CONTRACEPTIVE DEVICE (IUCD)

The Intrauterine Contraceptive Device (IUCD) is the most widely used reversible form of contraception in the world ***(Nelson et al., 2006)***.

Types of IUCDs:

Unmedicated IUCDs:

The Lippes Loop, made of plastic (polyethylene) impregnated with barium sulfate, is still used throughout the world except in the United States. Flexible stainless steel rings are widely used in China but not elsewhere ***(Sujuan et al., 1994)***. The other unmedicated devices are condemned because of their side effects as Pelvic Inflammatory Disease (PID), pain, bleeding, higher failure rate and expulsion rate.

Medicated IUCDs:

Copper IUCDs:

The first copper IUCDs were found with 200 to 250mm2 of wire, and two of these are still available except in the United States these are the TCu-200 and the Multiload-250. The more modern copper IUCDs contain more copper, and part of the copper in the form of solid tubular sleeves, rather than the wire, increasing the efficacy and extending lifespan. This group of IUCDs is represented in the United States by the TCu-380A

and in the rest of the world by the TCu-220C, The Nova T, and the Multiload-375. The modern generations of IUCDs in China include a stainless steel ring with copper wire that also releases indomethacin, which is very effective with a low expulsion rate and less blood loss, a V-shaped copper IUCD, and a copper IUCD shaped like the uterine cavity. The Saf-T is copper IUCD used only in Switzerland ***(Sujuan et al., 1994)***.

The TCu-380A is a T-shaped device with a polyethylene frame holding 380mm2 of exposed surface area of copper on its arms and stem. The polyethylene frame also contains barium sulfate, which render it radiopaque. The white polyethylene monofilament tail strings pass through and are knotted below a 3-mm plastic ball at the base of the stem. The boll helps to reduce cervical perforation with expulsion. The copper IUCD is approved by FDA for up to 10 years of use, but a recent study suggests that it may be effective for at least 12 years. No pregnancies were reported before the eighth year of use ***(United Nations Development Programme et al., 1997)***.

The TCu380Ag is identical to the TCu380A, but the copper wire on the stem has a silver core to prevent fragmentation and extend the lifespan of the copper. The TCu-380A Slimline has the copper sleeves flush at the ends of the horizontal arms to facilitate easier loading and insertion. The performance of the TCu-380Ag and the TCu-380 Slimline is equal to that of the TCu-380A ***(Sivin et al., 1991 and Sivin and Stern, 1994)***.

The Multiload-375 has 375 mm^2 of copper wire wound around its stem. The flexible arms were designed to minimize expulsions. This is a popular device in many parts of the world The Multiload-375 and the TCu-380A are similar in their efficacy and performance ***(Chi, 1993)***.

The Nova-T has a silver core to the copper wire, flexible arms, and a large, flexible loop at the bottom to avoid injury to cervical tissue, there was some concern that the efficacy of the Nova T decreased after 3 years in World Health Organization (WHO) data; however, results from Finland and Scandinavia indicate low and stable pregnancy rates over 5 years of use ***(Chi, 1993)***.

The Cu SAFE-300 IUCD has 300 mm^2 of copper in its vertical and transverse arm with sharply bent ends that are adapted to the uterine cavity and help to hold this IUCD in the fundus. It is made of more flexible plastic and is smaller in size than the world's two most popular IUCDs. The TCu-380A and the Multiload-375. Pregnancy rates with the CuSAFE-300 are comparable to these two devices, but rates of removal for pain and bleeding are reported to be lower ***(Kurz and Meier-Oehlke, 1991)***.

The hormone-releasing IUCD:

The concept of intra-uterine administration of progesterone for contraception was introduced in the US in 1970s. Following this work, the levonorgesterel-releasing intra-

uterine system was devised in Finland gaining a license there for contraception in 1990 and soon after in the UK. Its excellent contraceptive benefits have led to its wide-spread use. Since that time, the non contraceptive health benefits of these systems secondary to the effect of the local action of the progesterone on the endometrium have been observed and researched. This evidence has supported the granting of the licence for the use of the levonorgestrel releasing system for non contraceptive indication of menorrhgia and for the development of different types of intra-uterine system designed for the treatment of other non-contraceptive indications ***(Hockey et al., 2005)***.

Progestasert:

The Progestasert was the first progesterone-releasing intra-uterine system on the market. This has a drug reservoir of 38 mg of progesterone within its polymer of polydimethyl siloxan incorporated onto a T-shaped polymeric platform. The covering membrane allows a release of 65ug of progesterone daily into the uterine cavity for 18-24 months. It was manufactured in the US and received FDA approval in 1976 for use as a contraceptive in parous women for 1 year with a two year bio-availability ***(Soderstrom, 1994)***. It was available briefly in the UK until marketing for this product ceased in the summer of 2001 ***(Luukkainen et al., 2001)***.

The levonorgestreal releasing IUCD:

Mirena:

The Mirena intrauterine System (LNG-IUCD) has a T-shaped frame (based on the Nova T IUCD) 32 mm by 32 mm made of polyethylene surrounded by an elastomer sleeve in its vertical part. This sleeve is 1:1 mixture of 52 mg of levonorgesterel and polymethylsiloxane. The membrane also made of polymethylsiloxane which allow a controlled release of 20mcg of levonorgesterel daily at a constant rate over 5 years. At the end of the 5 years, the rate slowly decreased to 15mcg a day and decreases further to 12mcg at 7 years ***(Hockey et al., 2005)***.

The LNG-IUCD was first introduced in Finland in 1990 and is currently marketed in most European countries and in the US since 2000 ***(Lahteenmaki et al., 2000)***. The levonorgestrel IUCD is approved for 5 years, but lasts up to 10 years, and reduces the menstrual blood loss and pelvic infection rates ***(Sivin et al., 1991)***. Indeed, the levonorgestrel IUCD is about as effective as endometrial ablation for the treatment of menorrhagia ***(Crosignani et al., 1997)***. The local progestin effect directed to the endometrium can be utilized in patients on tamoxifen***, (Gardner et al., 2000)***, patient with dysmenorrhea ***(Vercellini et al., 1999)***, and postmenopausal women received estrogen therapy ***(Raudaskoski et al., 2002)***.